

Remarks:

Reconsideration of the application is requested.

Claims 1-4 are now in the application. Claim 1 has been amended. Claim 4 has been added.

Enclosed is an abstract in the English language of the reference EP 0 760 528 cited in the IDS mailed on July 16, 2002.

In item 3 on page 2 of the above-identified Office action, claim 1 has been rejected as being anticipated by *Francis et al.* (US 6,043,112) under 35 U.S.C. § 102.

In item 4 on page 3 of the Office action, claims 2 and 3 have been held allowable, if rewritten or amended to include all of the limitations of the base claim and any intervening claims.

The rejection and objection have been noted. Newly entered claim 4 contains the subject-matter of claims 1 and 2 or 3. Claim 4 is therefore believed to be allowable. Claim 1 has been amended in an effort to even more clearly define the invention of the instant application. Support for the changes is found on page 6, lines 13-14, of the specification.

Before discussing the prior art in detail, it is believed that a brief review of the invention as claimed, would be helpful.

Claim 1 as amended calls for, inter alia:

said stop zone having atoms of a doping substance determining a conductivity of said stop zone, said atoms of said doping substance having at least one energy level within the band gap of the semiconductor and at least 200 meV away from both a conduction band and a valence band of the semiconductor.

In item 3 on page 2 of the Office, the Examiner stated that:

"Francis et al teach (Figure 1) a power semiconductor ... comprising ... a stop zone ... having gold atoms, or, in the alternative, platinum atoms". In item 5 on page 3 of the Office action, the Examiner stated in the statement of reason for the indication of allowable subject matter that: "no prior art has come to light in which either selenium or sulfur was the dopant of the stop zone in a device as defined in claim 1. Nor is the substitution of either selenium or sulfur for either gold or platinum in the primary reference obvious in view of prior art."

Similarly it is believed that Francis et al. neither show nor suggest a stop zone having atoms of a doping substance determining a conductivity of said stop zone in a device as defined in claim 1.

It is accordingly believed to be clear that *Francis et al.* do not show the features of claim 1. Claim 1 is, therefore, believed to be patentable over the art and since claims 2-3 are dependent on claim 1, they are believed to be patentable as well.

In view of the foregoing, reconsideration and allowance of claims 1-4 are solicited.

Petition for extension is herewith made. The extension fee for response within a period of one month pursuant to Section 1.136(a) in the amount of \$ 110.00 in accordance with Section 1.17 is enclosed herewith.

Please charge any other fees which might be due with respect to Sections 1.16 and 1.17 to the Deposit Account of Lerner and Greenberg, P.A., No. 12-1099.

Respectfully submitted,

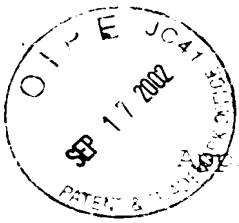


For Applicants

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Version with markings to show changes made:

Claim 1 (twice amended). A power semiconductor element,
comprising:

an emitter region;

a stop zone in front of the emitter region;

said emitter region and said stop zone having mutually
opposite conductivities; and

said stop zone having [foreign atoms] atoms of a doping
substance determining a conductivity of said stop zone, said
atoms of said doping substance having [with] at least one
energy level within the band gap of the semiconductor and at
least 200 meV away from both a conduction band and a valence
band of the semiconductor.

Semiconductor device on silicium base with a high blocking voltage edge termination

Patent Number: EP0760528
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Inventor(s): MITLEHNER HEINZ DR (DE); STEPHANI DIETRICH DR (DE)
Applicant(s): SIEMENS AG (DE)
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Application Number: EP19960112954 19960812
Priority Number(s): DE19951031369 19950825
IPC Classification: H01L29/06; H01L29/861; H01L29/872; H01L29/78
EC Classification: H01L29/06B2B3B, H01L29/167, H01L29/78B2
Equivalents: ☐ DE19531369, ☐ JP9107098
Cited Documents: DE3225991; WO9603774; FR2497405; CH659542; FR2480035

Abstract

The power semiconductor element has at least one n-type silicon semiconductor region (2), incorporating an active zone (3), supplied with a blocking voltage to provide a depletion zone (21). The active zone is enclosed by an edge zone (4). It is formed on or in the surface (20) of the active zone, made of a p-type silicon doped with a material having an acceptor level of at least 0.1 eV in silicon. Pref. the doping material for the edge zone is beryllium, zinc, nickel, cobalt, magnesium, tin, or indium.

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